Ocean-based Negative Emission Technologies

OCEAN NETs

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Abstract: This deliverable reports about the successful completion of three group discussions on marine carbon dioxide removal (CDR) with laypersons in Norway. The 2-hour group discussions were held online. In three groups, and a pilot group, between 2 and 7 participants discussed these three topics: (1) the environmental state of the oceans, (2) four selected marine CDR approaches, and (3) responsible research and innovation.
The four approaches were ocean fertilization, ocean alkalinization via ocean liming and electrochemical weathering in desalination plants, artificial upwelling, and blue carbon management via kelp forests, mangroves and seagrass meadows.

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Deliverable 3.2: Summary report on Workshop 2, laypersons' perceptions of marine CDR
Siri Veland

We held 4 online group discussions in Norway on 11th, 16th, 18th and 23rd March 2021. The first of these was a pilot group to test out the materials and facilitator's guide. In each of the 2-hour-sessions 2-7 participants discussed their perceptions of these 3 topics: (1) the environmental state of the oceans, (2) four selected marine negative emissions technologies (NETs), and (3) responsible research and innovation.

The participants were recruited via social media newspaper advertisements that asked respondents to follow a link to a short survey on their views on marine resources and climate change, as well as demographic characteristics. By responding to this questionnaire, they agreed to being contacted for invitation to participate in a focus group. They were selected based on their age, gender, educational background, and views on climate change to create diverse groups and enable a broad discussion. Each focus group sought participation from each age group, educational background, and view on climate change. The online survey screened for participants who were at least somewhat interested in the oceans to ensure that they would be interested to engage in the discussions.

Due to COVID19 restrictions the group discussions were held online instead of face-to-face. In the project proposal, we had planned to hold one in-person workshop for 6 hours with 10-12 participants. This is difficult to translate into an online setting because the attention span is lower in online meetings and the active interaction between people who have never met before is difficult to create in a virtual space and to maintain for 6 hours. Also engaging with 10-12 participants in an online setting is challenging. Together with the project partners at NORCE and the University of Oxford, we thus decided to reduce the number of participants to 5-7 and the duration of the groups to 2 hours. To broaden the potential to integrate diverse perceptions and viewpoints, we held 3 instead of one group discussion. Originally, it was planned to focus more strongly on the perceptions of the mesocosm experiments planned in Norway close to Bergen. As these have been postponed to 2022, we decided together with Javier Lezaun who is working on responsible research and innovation in OceanNETs to integrate responsible research into the group discussions but focus the attention on the general perceptions of marine CDR.

The focus groups took place from 7-9 pm. The first focus group on 11th March was a pilot group to assess the length, prompts, and graphics. The only modification for the remaining focus groups was a reordering of the four technologies. The group discussion was facilitated by Siri Veland (OceanNETs, NORCE) while student assistant Marthe Birkeland (NORCE) managed administrative and technical tasks before and during the meeting. The facilitator's guide to the focus groups had been developed by the WP3 team and Javier Lezaun (University of Oxford) and was modified slightly after the pilot group; the same guide is used in 3 group discussions in Germany. Siri Veland facilitated the discussion, briefly explained the graphics, replied to the participants' questions, and asked clarifying questions. The following marine CDR-approaches were discussed: (1) ocean fertilization, (2) ocean alkalinization via ocean liming and electrochemical weathering in desalination plants, (3) artificial upwelling, and (4) blue carbon management via kelp forests, mangroves and seagrass meadows. They were introduced and explained with the help of infographics that introduced the carbon cycle, carbon storage in Earth systems, and the four technologies (see Norwegian version below). OceanNETs WP3 researchers developed these graphics together with Rita Erven (responsible for graphic design), David Keller, Javier Lezaun, Judith Meyer, and Phil Renforth from the OceanNETs consortium.

Once the transcripts of the discussions from Germany and Norway are available, they will be analyzed to identify common and diverging themes in respondents' perceptions of the environmental state of the oceans, interventions into the marine environment, and marine CDR methods.

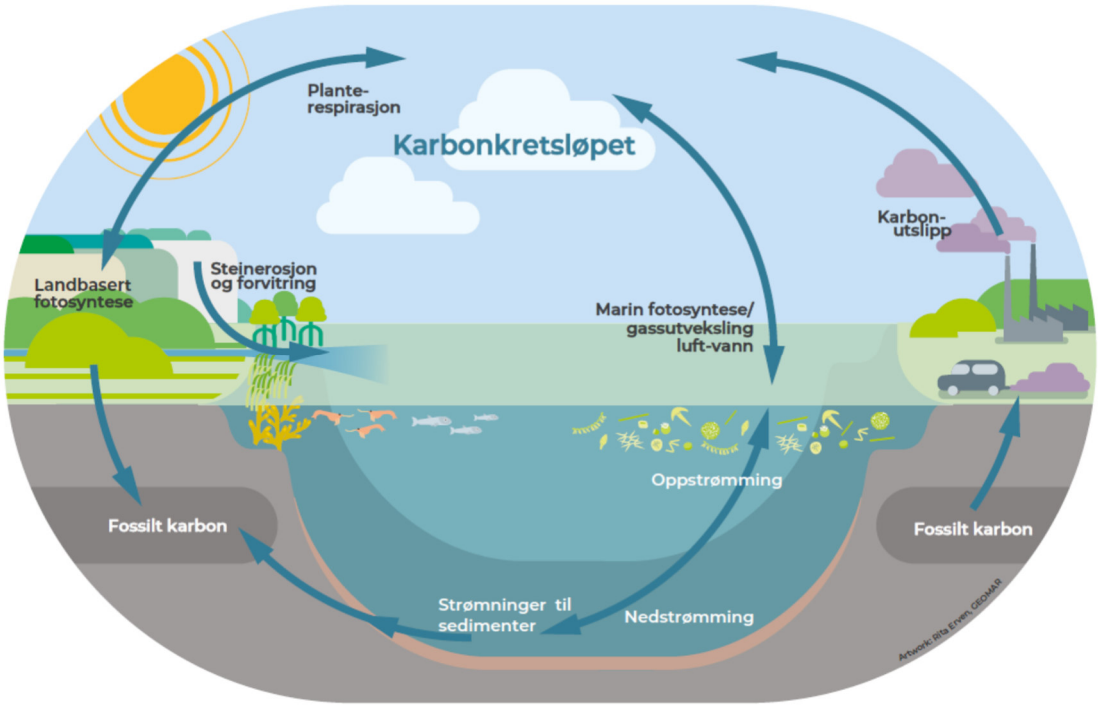


Figure 1: The carbon cycle

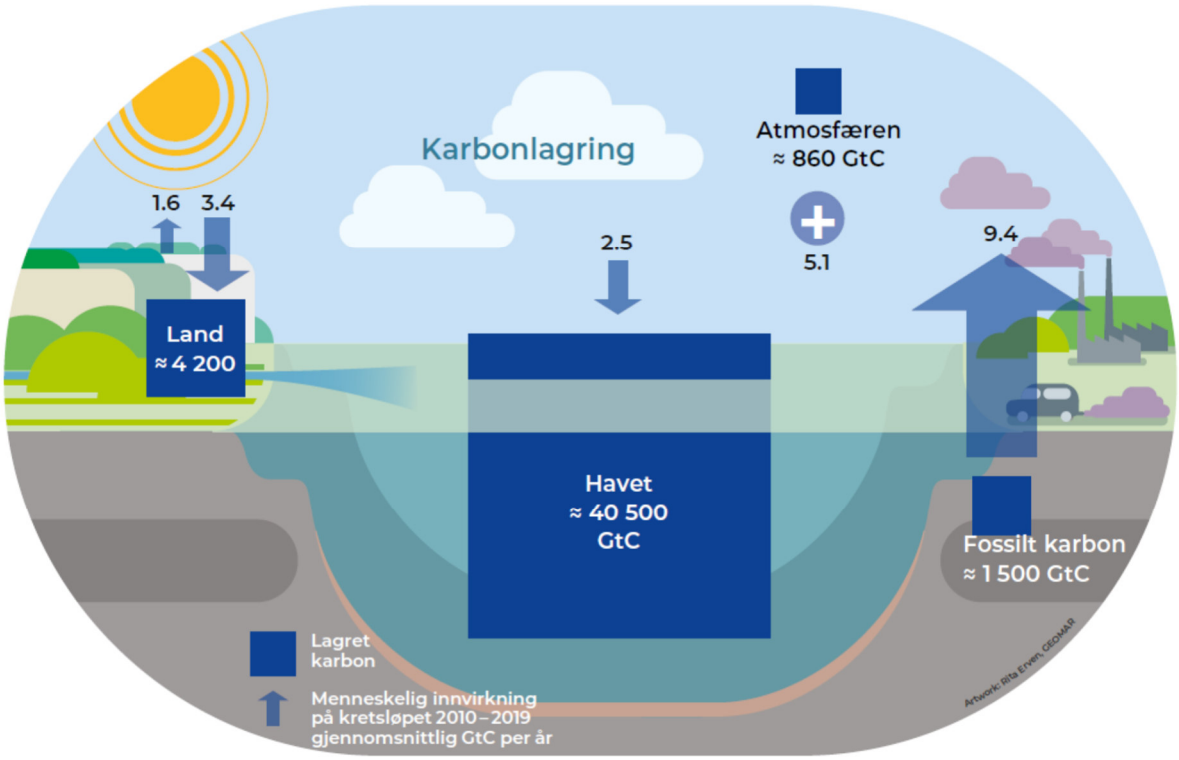


Figure 2: Carbon uptake, emissions, and storage in the carbon cycle 2010-2019 by land, ocean, and atmosphere taken from Friedlingstein, P., O'Sullivan, M., Jones, M. W., Andrew, R. M., Hauck, J., Olsen, A., ... & Zaehle, S. (2020). Global carbon budget 2020. Earth System Science Data, 12*(4), 3269-3340.*

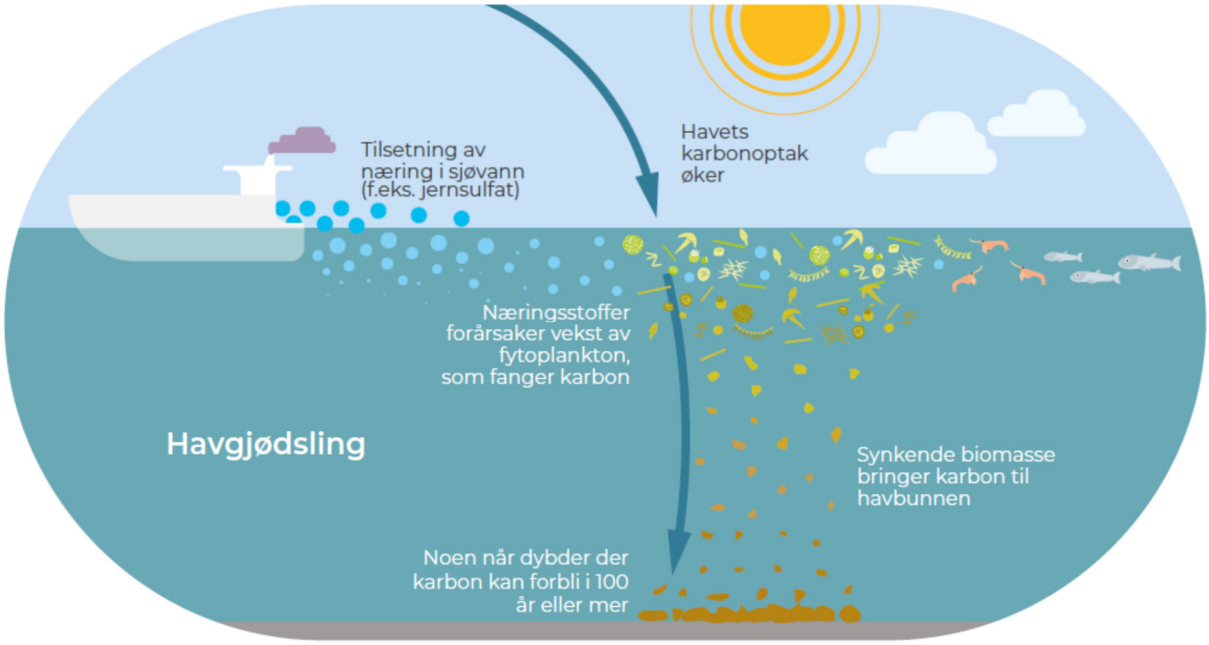


Figure 3: Ocean fertilization

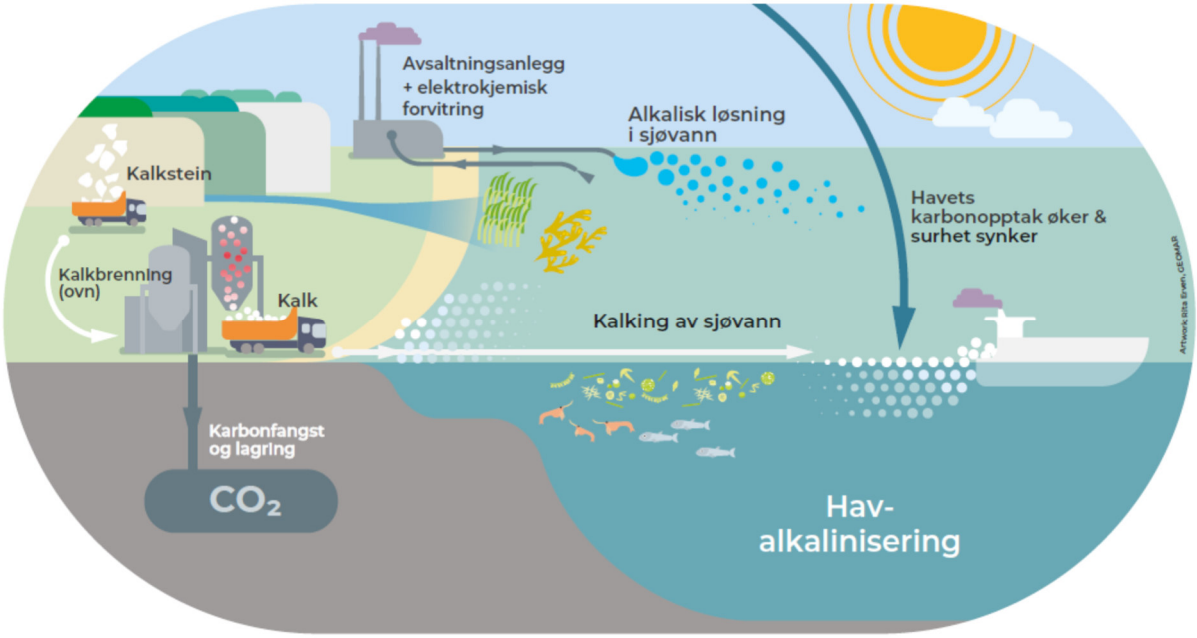
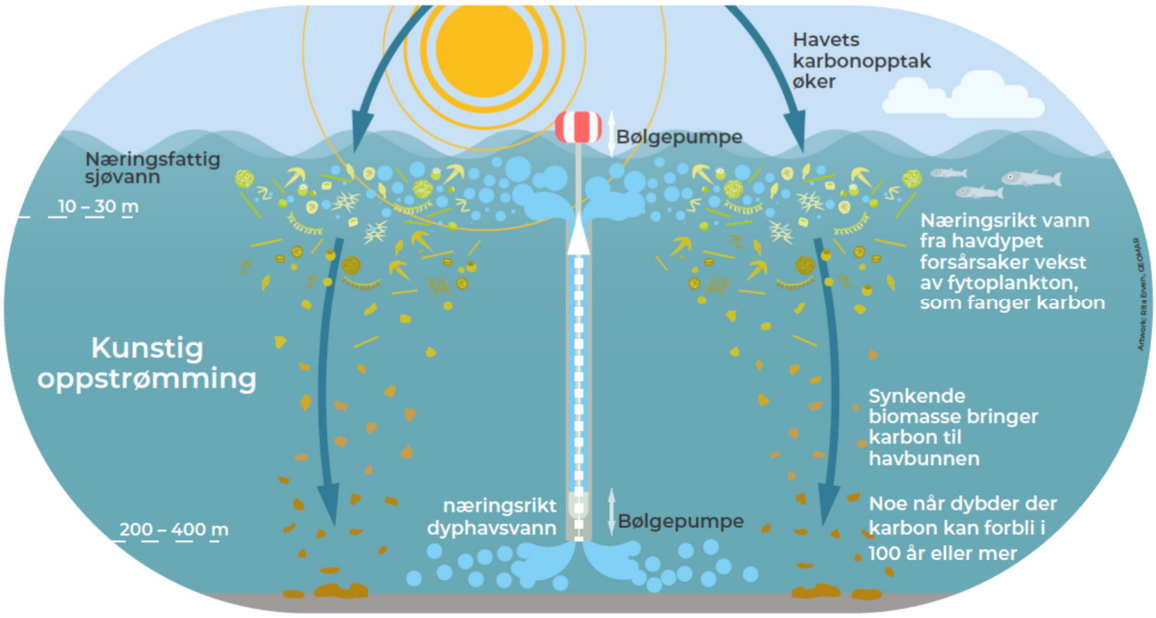
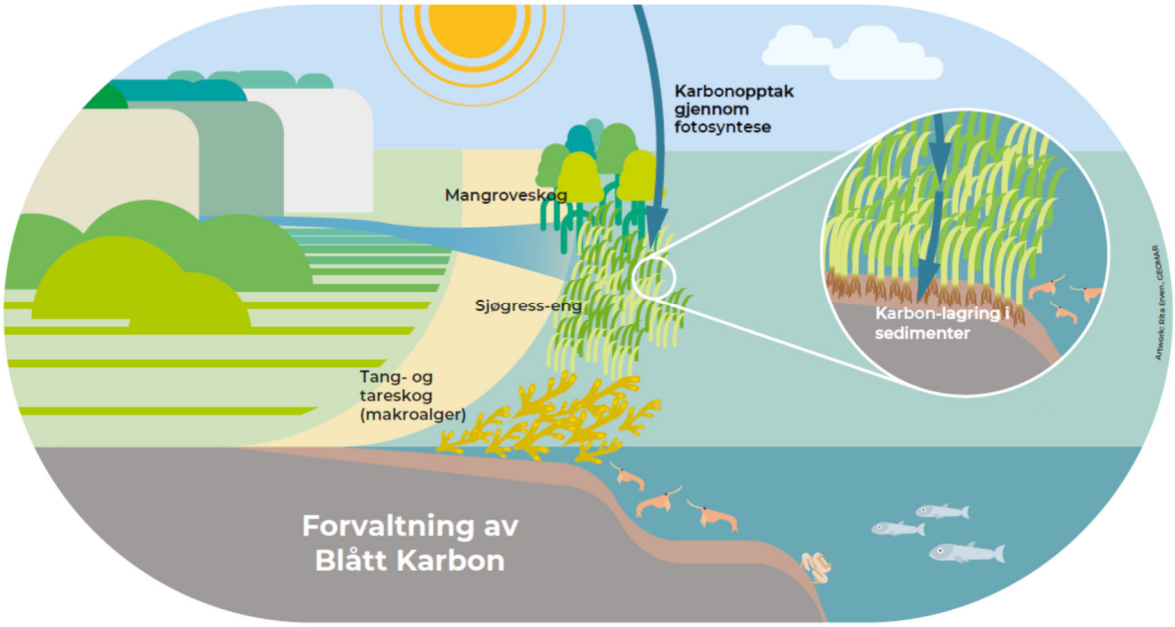


Figure 4: Ocean alkalinization



Graphic 5: Artificial upwelling



Graphic 6: Blue carbon management